Remarks

Claims 1, 6-11, 15-17, and 21-23 are pending in this application. Claims 1, 6, 7, 11, and 17 are being amended and claims 21-23 are being added herein without prejudice to clarify the claimed invention and to place the claims in better condition for allowance. No new matter has been introduced by virtue of the present amendments. Applicants respectfully request reconsideration of the above application in view of the present amendments and the following remarks. Please note that all the percentages are called out as weight percentages in the following remarks, unless otherwise stated.

Objection to claims 1 and 11 because of informalities

The Examiner states that the term "past-like" is incorrect in claim 1 and should be rewritten as paste-like. Applicants have amended claim 1 accordingly. The Examiner states that claims 1 and 11 contain the term "100 E C," which is vague since E C is not a conventional term and therefore should be rewritten as 100 degrees C. Applicants have amended claims 1 and 11 accordingly.

Rejection of claims 1, 4, 8-11, and 14-16 under 35 U.S.C. § 102(b) as being anticipated by *Stokes*

Claims 1, 4, 8-11, and 14-16 have been rejected under 35 U.S.C. § 102(b) as being anticipated by *Stokes* (U.S. Patent No. 3,858,319). According to the Examiner, *Stokes* discloses a method of applying solder to an aluminum body part comprising applying a fluxing agent, heating a fluxing agent to deoxidize the surface, applying a zinc-based solder filler, heating at least 100 degrees C lower than the melting temperature of an aluminum body, and bonding the solder to the aluminum part. (Office Action, 2/27/03, ¶ 8.) The Examiner also states that *Stokes* discloses a solder comprising by weight of 78% to 98% Zn and 2% to 22% Al by citing to column 2, lines 37-41 of *Stokes*. (¶ 8.) Applicants disagree that *Stokes* discloses such a solder filler. According to column 2, lines 37-41 of *Stokes*, a zinc-based solder filler alloyed with up to 10% Al and up to 2% Cu is disclosed. According to the Examiner, the fluxing agent disclosed in *Stokes* is comprised of organic compounds and metallic salts. (¶ 8.)

Applicants respectfully contend that Examiner's argument in ¶ 8 does not address every element of Applicants' invention as recited in claims 1, 4, 8-11, and 14-16. Examiner states that *Stokes* discloses "heating at least 100 degrees C lower than the melting temperature of an aluminum body." Without agreeing that this step is even taught by *Stokes*, this step is not recited by the claims. Claims 1 and 11 recite that the melting point temperature of the solder filler is at least 100 degrees C lower than the melting point temperature of the aluminum body part. The Examiner has not identified where *Stokes* discloses this element. Indeed, *Stokes* does not teach this element. As such, claims 1 and 11 and all claims depending from claims 1 and 11, *i.e.*, claims 4, 8-10, and 14-16 are patentable in light of *Stokes*.

Moreover, *Stokes* does not teach, disclose, or suggest applying a tin-based solder filler consisting of, by weight, of 81% to 85% Sn, 3% to 5% Zn, and 12% to 14% Cu to an aluminum body part, as recited in claims 1 and 11. Rather, *Stokes* discloses methods and compositions of joining aluminum members by a zinc-based solder filler. (Col. 2, Lines. 37-41.) The Examiner admits that *Stokes* discloses such methods and compositions in his statement supporting the § 102 rejection in light of *Stokes*. (¶ 8.) Claims 8-10 depend directly from claim 1 and are patentable because of the limitations found in claim 1, as well as their own limitations. In addition, claim 11 recites application of a filler/flux mixture in which the filler is a tin-based solder filler consisting of, by weight, of 81% to 85% Sn, 3% to 5% Zn, and 12% to 14% Cu. As stated above, *Stokes* does not disclose tin-based solder fillers for use with application to aluminum body parts. Moreover, *Stokes* does not disclose forming a filler/flux mixture comprising a tin-based solder filler and a fluxing agent. Rather, *Stokes* discloses treating aluminum, steel, copper, or other metal surfaces with a zinc chloride flux in molten form. (Col. 4, Lines 20-22.) The molten flux reacts with the metal surface to provide a zinc coating and a chloride salt of the metal treated. (Col. 4, Lines 23-25.) The method disclosed in *Stokes* does not contemplate mixing solder filler with a metal or metal alloy prior to application. Claims 15 and 16 depend directly on claim 11 and are patentable over *Stokes* for at least the same reasons that claim 11 is patentable as well as because of their own limitations. For at least these reasons, Applicants contend that claims 1, 4, 8-11, and 15-16 are patentable in light of the teachings of *Stokes*.

Rejection of claims 2, 12, 17, and 18 under 35 U.S.C. § 103(a) as being unpatentable over *Stokes* in view of *Harvey*

Claims 2, 12, 17, and 18 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Stokes* in view of *Harvey* (U.S. Patent No. 4,358,884). The Examiner admits that *Stokes* fails to teach a solder filler comprised of 73% to 85% Sn, 3% to 5% Zn, and 12% to 22% Cu, a filler/flux ratio of 10% fluxing agent to 90% tin-based alloy, and a filler/flux ratio of 50% flux to 50% zinc-based alloy. (¶11.) The Examiner contends that in light of *Stokes*, finding the optimum combination of flux to filler ratio would have been ordinary to one skilled in the art, since it has been held that discovering the optimum working ranges involves only routine skill in the art. Applicants contend that identifying the filler to flux ratio in light of *Stokes* is not obvious to one of ordinary skill in the art since *Stokes* does not disclose a filler to flux ratio. Examiner states that *Harvey* teaches using a solder filler comprising 14% to 20% Cu, 1% to 7.5% Zn, and the balance being Sn. According to the teachings of *Harvey*, this solder filler also contains 0.5% to 1.5% Fe. (Col. 1, Lines 48-50.) The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the Applicants' invention was made to provide 14% to 20% Cu, 1% to 7.5% Zn, and the balance being tin as taught by *Harvey* and in view of *Stokes*.

Harvey in light of *Stokes* does not teach, disclose or suggest the pending claims of the present invention. Pending claim 17 recites a filler/flux mixture comprised of, by weight, of about 10% of the fluxing agent and about 90% of a tin-based solder filler consisting of, by weight, of 81% to 85% Sn, 3% to 5% Zn, and 12% to 14% Cu. *Stokes*, in light of *Harvey*, does not teach such a tin-based solder filler. *Harvey* discloses a tin-based solder filler consisting of 14% to 20% weight Cu, 1% to 7.5% weight Zn, 0.5% to 1.5% weight Fe, and the balance Sn and containing no Pb. (Col. 1, Lines 47-50.) *Stokes* discloses a solder filler alloy that is substantially pure zinc or zinc alloyed with up to 10% Al, typically 5% Al, and up to 2% Cu. (Col. 2, Lines 37-41.) Moreover, *Harvey* and *Stokes* do not disclose, teach, or suggest providing a filler/flux mixture. The Examiner presents no statement arguing that *Harvey* discloses a filler/flux mixture, indicating that such mixture is not disclosed by *Harvey*. The Examiner contends that *Stokes* expressly discloses a filler/flux ratio even though the

Examiner has not cited a portion of *Stokes* that disclosed such a ratio. For at least these reasons, *Harvey* in light of *Stokes* does not render the pending claims unpatentable.

Rejection of claims 3, 5, and 13 under 35 U.S.C. § 103(a) as being unpatentable over *Stokes* in view of *Gustave*

Claims 3, 5, and 13 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Stokes* in view of *Gustave* (U.S. Patent No. 1,457,641.) According to the Examiner, the Examiner admits that *Stokes* fails to teach solder filler comprising 55% to 85% Sn, 12% to 40% Zn, and 3% to 5% Cu. (¶ 12.) According to the Examiner, *Gustave* discloses a solder composition comprised of 72% to 87% Sn, 10% to 25% Zn, and 0.5% to 2.5% Cu for purposes of durability. (¶ 12.)

According to *Gustave*, this solder filler is disclosed as consisting of 72% to 87% Sn, 10% to 25% Zn, .5% to 2.5% Pb, and .5% to 2.5% Cu. (Col. 2, Lines 75-77.) The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the Applicants' invention was made to provide a solder composition comprising 72% to 87% Sn, 10% to 25% Zn, and 0.5% to 2.5% Cu as taught by *Gustave* in light of *Stokes* since the above solder composition is durable. *Stokes* in view of *Gustave* fails to teach, disclose, or suggest the pending claims of the present invention. Claims 3, 5, and 13 have been cancelled, rendering this ground of rejection moot as to those claims.

New claims 21-23

Stokes, *Harvey,* and *Gustave*, individually or in combination, do not teach, disclose or suggest new claims 21-23. None of these references disclose applying a tin-based solder filler consisting of, by weight, 55% to 85% Sn, 12% to 40% Zn, and 3% to 5% Ni, Fe, Cu or Co, as recited in claim 21. *Stokes* discloses zinc-based soldering compositions. *Harvey* discloses a solder composition containing zinc, tin, copper and iron. Contrarily, the claimed invention only contains one metal from the group of nickel, iron, copper, or cobalt. *Gustave* discloses a solder composition which contains lead, a component not recited in the tin-based solder filler of claim 21. For at least these reasons, claim 21 is patentable over the cited references.

None of the references disclose, suggest, or teach the invention recited in claim 22. Claim 22 recites application of a zinc-based solder filler consisting of, by weight, 78% to 89% Zn and 11% to 22% Al. *Stokes* discloses a solder composition containing at most 10% Al. *Harvey* discloses a solder composition containing copper, iron, and tin, metal constituents not found in the claimed zinc-based solder filler. *Gustave* discloses a tin-based solder composition which contains copper and lead. The claimed solder filler composition provides valuable thermal and mechanical properties, including the inhibition of cracking and heat distortion of the aluminum body parts during application. For at least these reasons, claim 22 is patentable over the cited references.

Claim 23 depends directly on independent claim 11 and is therefore patentable for the same reasons that claim 11 is patentable and for its own limitation. Claim 23 recites that the forming step is comprised of providing the tin-based solder filler in the form of a hollow wire and injecting the fluxing agent into the hollow wire. This recitation is not disclosed by the art of record. This filler/flux wire is particularly suitable for filling in ditches or other blemishes on the surface of an aluminum body part.

Conclusion

For the foregoing reasons, Applicants believe that the Office Action of February 27, 2003 has been fully responded to. Consequently, in view of the above amendments and remarks, Applicants respectfully submit the application is in condition for allowance, which allowance is respectfully submitted.

Respectfully submitted,

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Attachment

VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended) A method of applying a solder filler to an aluminum body part, said method comprising the steps of:

applying a fluxing agent in [past-like] paste-like form to the aluminum body part;

heating the applied fluxing agent to deoxidize the surface of the aluminum body part;

applying a tin- [or zinc-]based solder filler to the deoxidized surface of the aluminum body part, the melting point temperature of the solder filler being at least 100 degrees [E] C lower than the melting point temperature of the aluminum body part and the tin-based solder filler consists of, by weight, of 81% to 85% Sn, 3% to 5% Zn, and 12% to 14% Cu; and

heating the solder filler to bond the solder filler to the aluminum body part.

6. (Amended) The method of claim [3] 21 wherein the solder filler consists of, by weight, 66.5% Sn, 30% Zn, and 3.5% Ni.

7. (Amended) The method of claim [4] 22 wherein the solder filler consists of, by weight, of 80% Zn and 20% Al.

11. (Amended) A method of applying a solder filler to an aluminum body part comprising the steps of:

forming a filler/flux mixture comprising a tin-based solder filler for aluminum body parts and a fluxing agent wherein the melting point temperature of the solder filler is at least 100 [E] degrees C lower than the melting point temperature of the aluminum body part and the tin-based solder filler consists of, by weight, of 81% to 85% Sn, 3% to 5% Zn, and 12% to 14% Cu;

applying the filler/flux mixture to the aluminum body part; and

heating the filler/flux mixture to bond the solder filler to the aluminum body part.

17. (Amended) The method of claim 11 wherein the filler/flux mixture is comprised of by weight about 10% of the fluxing agent and about 90% of [a] the tin-based solder filler.